

Aviation and the environment



Sir Richard Branson
Virgin Group Chairman
The environment is
everyone's responsibility

Ulrich Stockmann (MEP)

Emissions trading: a significant step
towards addressing the impact of
aviation on the environment

Airbus tackles the
environmental challenge

Interview with
David McMillan
ECAC Focal Point for
Environmental Matters

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ICAO's work on the environment

The CAEP/7 results

In February, international experts on aviation and the environment gathered at ICAO Headquarters in Montreal for the seventh meeting of the Organisation's Committee on Aviation Environmental Protection (CAEP/7). They reported on their work over the past three years and formulated recommendations to the ICAO Council. Seven new ICAO documents for addressing aircraft noise and emissions, as well as amendments to existing ICAO publications, were proposed and subsequently approved by the Council on 15 March. The main outcomes of CAEP/7 are described here.

by **Jane Hupe,**
Chief of the
Environmental
Unit, ICAO



Aircraft noise: “a balanced approach”

“Balanced approach” guidance developed in 2001 provide ICAO Members States with an internationally-agreed approach to address aircraft noise problems in a holistic, and environmentally and economically responsive way, based on four elements: noise at source, land use planning and management, operational measures, and operating restrictions. States endorsed this policy at the 35th ICAO Assembly, considering it a valuable tool for noise mitigation. CAEP/7 proposed that the guidance include socio-acoustic factors (“people issues”) and airport case studies.

Noise at source

Procedures for noise certification were revised and amendments to Annex 16, Volume I - Aircraft Noise were proposed. Provisions are related to atmospheric conditions in noise certification testing and measurement conditions (e.g. clarification of definitions relating to wind speeds), the measurement of aircraft noise received on the ground, the evaluation method for noise certification of helicopters, and an update to the guidelines for obtaining helicopter noise data for land-use planning purposes.

Amendments were also made to the Environmental Technical Manual (ETM) on the use of procedures in the noise certification of aircraft. They focused on procedures for noise certification guidance in flight test procedures for helicopters, and evaluation of noise measurement to establish non-acoustical change following engine modifications. Guidance material on differential global positioning was developed for inclusion in the ETM.

Operational measures

An important outcome of CAEP/7 was the development of a new ICAO manual proposing methods for computing noise contours around airports. It replaces ICAO Circular 205. The new guidelines represent a major advance in three important areas. First, it provides much-needed guidance on the implementation of aircraft noise contour modelling, especially with respect to the critical importance of correctly representing aircraft types and their operating configurations and procedures. Second, it fully describes up-to-date algorithms that incorporate the latest internationally agreed advances in segmentation modelling. Third, the methodology is supported by an online database from EUROCONTROL (International Aircraft Noise and Performance (ANP) database) allowing for a timely update of the data.

A new ICAO circular on noise abatement departure procedure (NADP) noise and emissions effects was developed, which provides information for airports and operators on noise and emissions (NOx and CO₂/fuel) effects of departure procedures designed in accordance with PANS-OPS provisions.

Building on Circular 303 – Operational Opportunities to Minimize Fuel Use and Reduce Emissions – further work on the estimated benefits to the environment of CNS/ATM system implementation (e.g. fuel savings and emission reductions) was undertaken and practical guidelines developed. This information was incorporated into the Global Air Navigation Plan for CNS/ATM Systems (Doc 9750).





Continuous Descent Approach (CDA) implementation and its associated benefits were revised through the CAEP/7 cycle. Until now, a global assessment has been difficult mainly because of inconsistent definitions of CDAs, the nature of CDA operations and the lack of an internationally-agreed methodology for the assessment of emissions or noise. It was agreed that CAEP would coordinate the operational aspects with other expert panels.

Aircraft engine emissions

ICAO's Annex 16, Volume II, was revised and updates proposed on the provisions for modernising current emissions certification methods, measurement and sampling requirements, and procedures for regulated emissions and aviation fuel supply composition.

CAEP/7 also proposed guidance material related to engine emissions

certification that will become an Environmental Technical Manual dedicated to emissions in support of Annex 16 Volume II. Until the manual is issued, this guidance material will be available on the ICAO website.

Airport local air quality guidance

CAEP/7 proposed guidance to States in implementing best practices with respect to local air quality at airports, and in assessing and quantifying airport source emissions. This guidance manual should consist of three parts. The first part will help users create inventories of aircraft and airport source emissions. It will contain background information on the regulatory context, drivers for addressing local air quality at airports, and details of how aircraft source emissions contribute to total emissions measured and modelled around airports. This material is available on the ICAO website.

The second part, dedicated to dispersion modelling and airport air quality measurement, should be ready by 2010. The third part will address mitigation and interrelationships.

Nitrogen oxides (NOx) goals

For CAEP/7, a panel of independent experts was tasked with reviewing technologies to control nitrogen oxides (NOx). The group considered information on the relationship between goal-setting and standard-setting, on atmospheric science and on current and developmental technology. They assessed the industry's ability to reduce NOx emissions at source, provided information on possible trends in future emissions reduction over the long term, and considered possibilities for improvement. To define technological feasibility, the experts used a Technology Readiness Level (TRL) scale. This scale is a general tool characterising the level of development of new technologies. Based on this work, they developed medium- and long-term technology goals for NOx. Medium-term goal refers to the level of emissions produced by a specific engine thrust category in service in ten years' time (or a TRL of 6). Long-term goal refers to an improvement of engine emissions performance in about twenty years (or TRL 2).

In relation to mid-term goals (2016), the group estimated a 45% reduction on the current standards. As for the long-term goal (2026), it estimated that a reduction of some 60% would be attainable.

CAEP/7 agreed that the use of the

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The CAEP/7 results

TRL scale would be an integral part of the goal-setting process and that TRL8 (flight qualified through test and demonstration) should be accepted as defining feasibility in the context of standard-setting.

Market-based measures

Voluntary measures

At present, it is not easy for States and the aviation community to share information on voluntary activities aimed at reducing the impact of greenhouse gases from aviation on the climate. In order to facilitate dialogue on this issue, CAEP has collected information on voluntary actions by States and aviation stakeholders.

This information will be updated on an annual basis and posted on the ICAO website. Sharing the information will help entities initiate environmental protection measures or improve their current activities.

Local air quality charges

Guidance on emissions levies related to local air quality was developed by CAEP, consistent with ICAO policy.

Emissions trading

One of the highlights of the meeting was proposed guidance for incorporating international aviation emissions into States' emissions trading schemes, consistent with the United Nations Framework Convention on Climate Change process. The draft guidance focuses on aviation-specific issues, identifies options and offers potential solutions:

- Aircraft operators should be the accountable international aviation entity for purposes of emissions trading.

- Obligations should be based on total aggregated emissions from all covered flights performed by each aircraft operator included in the scheme.
- States, in applying an inclusion threshold, should consider aggregate air transport activity (e.g. CO₂ emissions) and/or aircraft weight as the basis for inclusion.
- States should start with an emissions trading scheme that includes CO₂ alone.
- States should apply the Intergovernmental Panel on Climate Change definition of international and domestic emissions for the purpose of accounting for greenhouse gas emissions as applied to civil aviation.
- States will need to put in place an accounting arrangement that ensures that emissions from international aviation are counted separately and not against the specific reduction targets that States may have under the Kyoto Protocol.
- As regards trading units, States will need to consider economic efficiency, environmental integrity, and equity and competitiveness when making a choice.

On the question of geographic scope, the draft guidance recommends that States take into account an ICAO Council request that CAEP include the various options with regard to geographic scope, describing their advantages and disadvantages, start to address the integration of foreign aircraft operators on a mutually agreed basis, and continue to analyse further options. The draft guidance will include an introduction emphasising that the majority of ICAO Council members do not currently favour a non-mutually agreed approach. The ICAO Assembly will further consider this issue.

Next steps

The Committee will continue to address the impacts of aircraft noise and emissions and study policy options on the use of technical and operational solutions, while continuing to consider market-based measures.

One of the future items CAEP/7 will consider is the further development of a methodology to carry out environmental assessments of ATM projects. The goal is to quantify the impact on the environment in terms of the cost of fuel burned, greenhouse gas emissions, air quality impacts and noise. This method will facilitate the development of trade-off considerations and hopefully lead to improvements in efficiency and capacity of ATM systems.

Emphasis will also be given to the work on modelling and databases to better estimate aviation's impact on the environment, and cooperation with EUROCONTROL will continue in this area.

Forthcoming events

The ICAO Colloquium on Aviation Emissions will be held in Montreal on 14-16 May 2007. It will enhance the level of environmental information available to States and provide a forum on aviation emissions so as to facilitate discussion and decision-making.

Another milestone this year will be the publication of ICAO's first Environmental Report, which is to be issued every Assembly year.

We look forward to the 36th Session of the ICAO Assembly in September of this year, as the Organisation's Member States and aviation stakeholders review achievements and agree on the policy of the Organisation in this field. ■■